

CLAIMS

We claim:

1. A method for storing data in one or more data storage systems by selecting from among at least a first operating mode and a delta replication operating mode, comprising:

5 storing data pursuant to the first operating mode;

ascertaining a first status of a criterion pertaining to an activity performed by the one or more data storage systems while operating in the first operating mode;

monitoring a change in the criterion to a second status;

10 in response to the change, storing data pursuant to the delta replication operating mode.

2. The method of claim 1, wherein the first operating mode includes continuous replication.

15 3. The method of claim 2, wherein the continuous replication is performed synchronously.

4. The method of claim 2, wherein the continuous replication is performed asynchronously.

20 5. The method of claim 1, wherein the one or more data storage systems include a primary storage system and a backup storage system.

6. The method of claim 1, wherein the criterion includes an indicator of a performance of a communication link between a primary storage system and a backup storage system.

5 7. The method of claim 1, wherein the second status includes an indication of an interruption in a transmission of data via the communication link.

8. The method of claim 1, wherein the criterion includes a comparison of a first rate of data flowing into a memory in a data storage system, and a second rate of data flowing
10 from the memory.

9. The method of claim 8, wherein the second status includes an indication that the second rate exceeds the first rate.

15 10. The method of claim 1, wherein the criterion includes a measure of a quantity of data stored in a memory in the data storage system.

11. The method of claim 1, wherein the criterion includes a measure of a redundancy within a memory in the data storage system.

20 12. The method of claim 11, further comprising identifying a first quantity of data required to be transmitted from the data storage system to a backup storage system in order to store a specified set of data items by the first operating mode, and identifying a

second quantity of data required to be transmitted from the data storage system to the backup storage system in order to store the set of data items by the delta replication operating mode, wherein the measure is a comparison of the first quantity and the second quantity.

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13. A method for storing data in one or more data storage systems by selecting from among at least a delta replication operating mode and an alternative operating mode, comprising:

storing data pursuant to the delta replication operating mode;

10 ascertaining a first status of a criterion pertaining to an activity performed by the one or more data storage systems while operating in the delta replication operating mode;

monitoring a change in the criterion to a second status;

in response to the change, storing data pursuant to the alternative operating mode.

15 14. The method of claim 13, wherein the alternative operating mode includes continuous replication.

15. The method of claim 14, wherein the continuous replication is performed synchronously.

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16. The method of claim 14, wherein the continuous replication is performed asynchronously.

17. The method of claim 13, wherein the one or more data storage systems include a primary storage system and a backup storage system.

18. The method of claim 13, wherein the criterion includes an indicator of a performance of a communication link between a primary storage system and a backup storage system.

19. The method of claim 13, wherein the first status includes an indication of an interruption in a transmission of data via the communication link.

20. The method of claim 13, wherein the criterion includes a comparison of a first rate of data flowing into a memory in a data storage system, and a second rate of data flowing from the memory.

21. The method of claim 20, wherein the first status includes an indication that the second rate exceeds the first rate.

22. The method of claim 13, wherein the criterion includes a measure of a quantity of data stored in a memory in the data storage system.

23. The method of claim 13, wherein the criterion includes a measure of a redundancy within a memory in the data storage system.

24. The method of claim 23, further comprising identifying a first quantity of data required to be transmitted from the data storage system to a backup storage system in order to store a specified set of data items by the delta replication operating mode, and identifying a second quantity of data required to be transmitted from the data storage system to the backup storage system in order to store the set of data items by the alternative operating mode, wherein the measure is a comparison of the first quantity and the second quantity.

25. A system for storing data by selecting from among at least a first operating mode and a delta replication operating mode, comprising:

one or more data storage systems for storing data pursuant to the first operating mode; and

a processor for ascertaining a first status of a criterion pertaining to an activity performed by the one or more data storage systems while operating in the first operating mode, monitoring a change in the criterion to a second status, and, in response to the change, storing data in the one or more data storage systems pursuant to the delta replication operating mode.

26. The system of claim 25, wherein the first operating mode includes continuous replication.

27. The system of claim 26, wherein the continuous replication is performed synchronously.

28. The system of claim 26, wherein the continuous replication is performed asynchronously.

5 29. The system of claim 25, wherein the one or more data storage systems include a primary storage system and a backup storage system.

10 30. The system of claim 25, wherein the criterion includes an indicator of a performance of a communication link between a primary storage system and a backup storage system.

31. The system of claim 25, wherein the second status includes an indication of an interruption in a transmission of data via the communication link.

15 32. The system of claim 25, wherein the criterion includes a comparison of a first rate of data flowing into a memory in a data storage system, and a second rate of data flowing from the memory.

20 33. The system of claim 32, wherein the second status includes an indication that the second rate exceeds the first rate.

34. The system of claim 25, wherein the criterion includes a measure of a quantity of data stored in a memory in the data storage system.

35. The system of claim 25, wherein the criterion includes a measure of a redundancy within a memory in the data storage system.

5 36. The system of claim 35, further comprising identifying a first quantity of data required to be transmitted from the data storage system to a backup storage system in order to store a specified set of data items by the first operating mode, and identifying a second quantity of data required to be transmitted from the data storage system to the backup storage system in order to store the set of data items by the delta replication
10 operating mode, wherein the measure is a comparison of the first quantity and the second quantity.

37. A system for storing data by selecting from among at least a delta replication operating mode and an alternative operating mode, comprising:

15 one or more data storage systems for storing data pursuant to the delta replication operating mode; and

a processor for ascertaining a first status of a criterion pertaining to an activity performed by the one or more data storage systems while operating in the delta replication operating mode, monitoring a change in the criterion to a second status, and,
20 in response to the change, storing data pursuant to the alternative operating mode.

38. The system of claim 37, wherein the alternative operating mode includes continuous replication.

39. The system of claim 38, wherein the continuous replication is performed synchronously.

5 40. The system of claim 38, wherein the continuous replication is performed asynchronously.

41. The system of claim 37, wherein the one or more data storage systems include a primary storage system and a backup storage system.

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42. The system of claim 37, wherein the criterion includes an indicator of a performance of a communication link between a primary storage system and a backup storage system.

15 43. The system of claim 37, wherein the first status includes an indication of an interruption in a transmission of data via the communication link.

44. The system of claim 37, wherein the criterion includes a comparison of a first rate of data flowing into a memory in a data storage system, and a second rate of data flowing
20 from the memory.

45. The system of claim 44, wherein the first status includes an indication that the second rate exceeds the first rate.

46. The system of claim 37, wherein the criterion includes a measure of a quantity of data stored in a memory in the data storage system.

5 47. The system of claim 13, wherein the criterion includes a measure of a redundancy within a memory in the data storage system.

48. The system of claim 47, further comprising identifying a first quantity of data required to be transmitted from the data storage system to a backup storage system in
10 order to store a specified set of data items by the delta replication operating mode, and identifying a second quantity of data required to be transmitted from the data storage system to the backup storage system in order to store the set of data items by the alternative operating mode, wherein the measure is a comparison of the first quantity and the second quantity.

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